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NEW PRIORITIES FOR U.S. TECHNOLOGY POLICY

HEARING

BEFORE THE

COMMITTEE ON COMMERCE SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED SECOND CONGRESS

FIRST SESSION

ON

NEW PRIORITIES FOR U.S. TECHNOLOGY POLICY

MARCH 20, 1991

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TABLE OF CONTENTS

	Page
Opening statement by the Chairman	1
Opening statement by Senator Gore	10

LIST OF WITNESS

Bloch, Erich, distinguished fellow, Council on Competitiveness	5
Fisher, George M.C., chairman, Council on Competitiveness	2
Letter of April 5, 1991	16

NEW PRIORITIES FOR U.S. TECHNOLOGY POLICY

WEDNESDAY, MARCH 20, 1991

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice,at 2:02 p.m., in room SR-253, Russell Senate Office Building, Hon. Ernest F. Hollings (Chairman of the Committee), presiding.

Staff members assigned to this hearing: Pat Windham, professional staff member and Louis Whitsett, minority staff counsel.

OPENING STATEMENT BY THE CHAIRMAN

The CHAIRMAN. Good afternoon. Welcome to our hearing on new priorities on U.S. technology policy. The United States now faces an historical choice. We have won the Cold War and the Gulf War. Now we must ask whether we will win the "market war," the international competition to see which countries will control the technologies and industries of the future and the jobs and prosperity that will accompany them.

The United States has made a commitment over the past 45 years to lead the world in defense technology, but that commitment has not been matched by a dedicated effort at the highest levels of Government also to lead the world in industrial technology. Instead, Government often has sat on the sidelines while other countries take over the consumer electronic market, batter our semiconductor and machine tool industries, and now challenge our computer sector. Ironically, the decline of civilian technology now threatens the very military capabilities that overwhelmed Iraq. How will we guild the best new weapons if other countries have the best electronics?

We now face a choice. We can choose continued economic decline, or we can choose a revitalized American industrial base. The decision is one that faces both industry and Government. It will take both, working together, to restore American economic competitiveness.

Fortunately for the country, American industry is increasingly taking the lead in proposing new policies and new priorities to restore American economic strength. Our business leaders know the stakes and understand the competition. Unlike many in Government, they understand what it takes to compete effectively against our trading partners. One of the industry groups that has gone the furthest in thinking through these problems and coming up with solutions is the Council on Competitiveness.

Today, the Commerce Committee will review the Nation's technology priorities, including Federal technology priorities, in light of the findings and

recommendations of a major new report by the Council on Competitiveness. The report, entitled "Gaining New Ground: Technology Priorities for America's" Future, is a landmark study not only because of its analysis of where the U.S. is strong and weak in 23 critical industrial technologies but also because of the clarity and thoughtfulness of its recommendations.

The report lays it on the line, and I quote: "The United States is already losing badly in many critical technologies. Unless the Nation acts today to promote the development of generic industrial technology, its technological position will erode further, with disastrous consequences for American jobs, economic growth, and national security."

The study goes on to discuss the coordinated industry-government programs in other countries, and then says: "Problems arising from foreign competition have been compounded by the lack of a timely, coordinated, and effective U.S. industry and government response."

The report is equally clear about what government and industry must do. It makes this point about Federal science and technology policy: "The American people and its leaders have too readily assumed that preeminence in science automatically confers technological leadership and commercial success as well. It does not.... The federal government should view support of generic industrial technologies as a priority mission."

The Council says the following about industry's role: "Unless American firms improve their ability to reach out and bring technology to market rapidly in the form of quality products, processes, and services, U.S. competitiveness will continue to erode—no matter how ambitious or far-reaching government technology policy is."

In my view this is a landmark report, which tells both industry and Government what must be done to restore this country to technological leadership and long-term economic prosperity. The question now is whether leaders in industry and Government will respond.

Today we will hear more details regarding what the Council learned during its 2-year study of critical technologies and U.S. technology policy.

To present the Council's findings and recommendations, the committee has invited two distinguished witnesses. George Fisher is the new chairman of the Council on Competitiveness, succeeding John Young of Hewlett-Packard. Mr. Fisher is also chairman and Chief executive officer of Motorola, Inc. Mr. Fisher understands technology. He holds a bachelor's and master's degree in engineering and a doctorate in applied mathematics. Before joining Motorola, he spent 10 years at the prestigious Bell Laboratories.

Erich Bloch, who currently serves as Distinguished Fellow at the Council on Competitiveness, is an old friend of this committee who is well known to the Members of Congress. He brings a lifetime of experience to these issues, both from his 30 years with IBM and his 6 years as director of the National Science Foundation.

Gentlemen, we welcome you both, and particularly Dr. Bloch. I am glad to see you in milder weather. I think one of the last times we were together I think it was 50 below zero. So we welcome you back to the land of Nod.

Let us see if we can wake them up. Who wants to go first? Mr. Fisher.

STATEMENT OF GEORGE M.C. FISHER, CHAIRMAN, COUNCIL ON COMPETITIVENESS, AND CHAIRMAN AND CHIEF EXECUTIVE OFFICER, MOTOROLA, INC.

Mr. FISHER. Thank you, Mr. Chairman. My name is George Fisher. Today I sit before you as the chairman of the Council on Competitiveness, which is a

council of private, nonprofit advocacy groups from business, labor, and universities.

We have but one objective, clearly stated: to improve the ability of U.S. companies and workers to compete in global markets. This morning, as you mentioned, the Council released our major report, entitled "Gaining New Ground: Technology Priorities for America's Future." This report examines the erosion of America's once commanding lead in critical technologies and, perhaps more importantly, recommends what we as a Nation must do to get it back.

In it we ask one basic question, do our current national policies and priorities adequately address the commercial technology challenge facing the United States? It concludes that they do not, and recommends a series of actions by Government, industry, and universities to strengthen America's technological leadership.

This afternoon I would like to focus my remarks on the message contained in this report in summary fashion. But first let me comment on why the Council chose to undertake this project. As you all know, there is a debate in this country about how U.S. Government and private sector can improve the ability of the United States to compete in global markets. While more and more people, including leaders from business, Government, labor, and academia, recognize that there is a problem, there is still some considerable disagreement about what should be done to address it.

Some in fact insist that the Government should not involve itself in issues related to international competition. They fear that any efforts to forge partnerships between the public and private sector are doomed to failure, that somehow the U.S. Government and industry are absolutely incapable of cooperating in ways that will improve America's industrial competitiveness. Some say it is simply wrong for the Government to even be involved.

Gaining New Ground reflects another view. It is based on the conviction that Government and the private sector can, in fact, work together to significantly strengthen the ability of American industry and workers to compete in world markets. Our recent experience in the Middle East supports this conviction. If there are lessons from America's triumph in the Persian Gulf, they are that technology is critical to America's future, that Government and industry can cooperate effectively, and that no challenge is too great when the Nation pulls together with a clear objective, and a clear sense of national purpose.

Gaining New Ground is not an ordinary report. It represents the first time, in my recollection at least, that America's corporate, labor, and academic leaders have reached a consensus on defining critical technologies, and what all of our institutions need to do to ensure that the United States can compete in these technologies.

It points to the potential of effective partnerships, and of particular importance to you in Congress, it lays down specific policy frameworks that include recommendations for the public and the private sector.

This report is the product of an intensive two-year project, chaired by Admiral Bob Inman. The project was characterized by uncommon cooperation and involvement on the part of the public and the private sectors. In preparing the report the Council on Competitiveness assembled a blue ribbon advisory committee of leading technology experts from industry, labor, and academia around the country, and consulted closely with Government officials in the process.

These individuals met regularly over the course of two years and conducted an in-depth analysis of nine major technology-intensive industries: aerospace, chemicals and allied products, computers and software, construction, drugs and

pharmaceuticals, electronic components and equipment, machine tools, motor vehicles, and telecommunications.

These sectors represent a broad cross-section of the U.S. economy. In fact, together they account for more than $1 trillion in sales and directly employ over 12 million people. In many respects our current and future prosperity depends on the performance of these very industries who were involved in this study.

In assessing the specific technology requirements of each sector, the Council asked three basic questions: what are the critical technologies, what do we need to do as a Nation to encourage and sustain them, and beyond the parochial interests of each sector, what is the broader national interest. Our intent was not to focus on sector-specific recommendations and special interests technologies or politics, but to develop a private sector consensus about the core critical technologies that cut across many different sectors of our economy, and in fact drive U.S. competitiveness.

In the report, the Council identified such technologies and documents where this country stands on each of them. Gaining New Ground focuses on critical generic technologies that are crucial to America's economic performance and national security. Advances in materials, electronic components and equipment, information systems and engineering, and production technologies are driving innovation and competitiveness in many industries.

One of the major findings of this report is that industries and Government agencies around the world, including not only those in Japan and Europe, but many right here in the United States, seem to have identified largely the same critical technologies. The difference, I might suggest, is that many foreign governments are systematically pursuing leadership in these technologies while American support for them is neither strategic nor comprehensive.

Many will find this report disturbing. I hope so. It states that the U.S. position in many critical technologies is slipping and, in some cases, has been lost altogether. It declares that U.S. public policy does not adequately support American leadership in critical technologies, and it recognizes that American industry and universities must share the blame for the erosion of America's technological leadership.

The report points out, correctly I believe, that leadership in technology in closely linked with leadership in commercial markets. Unless ideas in the laboratory can be transformed quickly into successful products in the market place, our jobs, standard of living, and lastly, our national security are certainly at risk.

Despite these warnings, I think that the report is fundamentally encouraging. It represents the first time that America's corporate, academic and labor leaders have reached a consensus on these questions. It shows that, by working together, we can build on the strengths that have made this Nation great.

I will not detail the many policy recommendations contained in the report, but I would like to note that they build on several initiative already under way in the Government and in the private sector. They speak to the need to focus U.S. R&D more concretely on critical generic technologies which drive economic growth; to make sure that the Government policy-making machinery is focused more clearly on issues related to technology and competitiveness; to create an economic environment that will encourage industry to invest in technology; and lastly to make sure that America's technology infrastructure is truly world class.

The renewal of American technological leadership does not require major new Government programs or funding. What it does require is a new national priority and a sense of partnership among industry, Government, labor, and universities. With this kind of leadership and cooperation we can regain much of our

technological leadership. I hope and I feel we dare not let this report gather dust. It is not simply a well-documented inventory of our technological capabilities; it is, in fact, a call to action on the part of all of us, and the time to act is now. I would now turn it over to Erich Bloch.

STATEMENT OF ERICH BLOCH, DISTINGUISHED FELLOW, COUNCIL ON COMPETITIVENESS

Mr. BLOCH. Thank you, Mr. Chairman. Because of your initiative and invitation, I testified before this committee in August of last year while I was still director of the National Science Foundation. My appearance today is separated by 6 months and a war in which technology played a successful and a visible role, but my concerns have stayed the same as they were in August, namely the country's leadership and ability to compete in the world market share.

Let me refer back to my testimony of last August, in which I said, the Nation's competitiveness is not so much determined anymore by natural resources, so access to low- cost labor, but by the generation, access, and rapid deployment of new knowledge and technical insights, new high quality products and processes, and the availability of a technically trained work force.

The report of the Council on Competitiveness issued today supports this observation and this concern. The report is not only a list of critical general technologies covering a broad range of topics, nor is it merely a judgment of our Nation's standing in these technologies. It also contains a set of recommendations to gain and retain our position as an economic leader and a world power.

The purpose the study was not to find the culprit, or one sector of our society that can fix or even address the problem. Also, it is a call to action for industry, labor, academia, and Government, including Congress; in fact, our whole society.

What are the findings? The report identifies many of the critical generic technologies that are important to our well- being. The report first states that there is a broad consensus both domestically and internationally as to which technologies are critical and generic and drive economic growth and competitiveness. American research and American industry pioneered many of these technologies, such as numerically controlled machine tools, robotics, opto-electronics, semiconductors, many more.

We have lost the market leadership to foreign competitors, who with the active support and funding of their governments, have been more aggressively investing in these technologies and more innovative in adapting products to the marketplace.

The report points out the U.S. industry is doing well in basic science. But we are less likely to do well in the long- run when fast-moving generic technologies with long gestation times and big investments for their developments are prerequisites. These are many of the important ones, however. Industry, Government, and academia, all of those together, are not sufficiently focused on this important problem.

The actions that the Council on Competitiveness report outlines are the following. Industry needs to improve the commercialization process. Most of the technologies that will drive economic growth during the next decade already exist, but effective commercialization depends on management that promotes both the development of technology and the application in the world marketplace. That is industry's task and industry's responsibility. But it is not just a job for industry. It takes industry in concert with academia and Government to address this issue. It takes a collaboration among these important sectors of our society.

Let me address our current public policy, which is both inadequate and ambivalent in its interest and support in addressing the issues that relate to the role of technology in U.S. competitiveness. First, we need leadership, leadership at the highest level, to make it clear that our standing in technology and our standing as an economic world power are synonymous. We just learned a valuable lesson in the Persian Gulf. Technology and strategic thinking can make the difference between winning or losing. That same strategic thinking could produce the same results in our economic situation.

Second, to improve our competitiveness we must have a viable infrastructure. This means an education and research system from which we can draw a quality technical work force and new knowledge and innovation. This means research facilities and equipment at our universities, Government, and industrial laboratories, and a transportation and communication network that is at the leading edge of technology.

Third, we need increased collaboration among companies, industry sectors, Government laboratorIes, and academia at the precompetitive stage of technology development. Individual companies can no longer go it alone because of the increasing competition, because of the actions of other governments to support their industries, because of the accelerated pace of development and its increasing cost, and because of the scarce human resources available to individual enterprises.

Fourth, business and industry must establish more effective technology networks to help us compete. Individual firms should use their foreign competition as a benchmark, setting goals to meet and surpass the best commercialization process—practices, no matter where they exist.

What can Congress do? Congress and the administration must be persuaded of the need to augment our 40-year-old science policy with a technology policy. When Bush had the idea that science is important as a standard of living and the security of the country, he sold that idea to Congress and the administration. Science is as important as it always has been, but we are the turning point because generic technologies are becoming more critical. Support for the generic technologies is essential.

OSTP has published a document entitled U.S. Technology Policy, acknowledging the Government's role, together with industry in generating these important technologies. The administration deserves much credit for this step. It is now time to put a strategy in place that executes the stated policy. This report is industry's view of such a strategy. This effort must be led by industry, with Government and academia in supporting roles.

The 1992 budget is an admirable start for strengthening our technical standing. But in general, it is clear that prioritization will and must occur. I urge this committee to focus on the balance within the R&D budget. It means civilian and military R&D expenses and favors the former. I urge the committee to look at the big-ticket, prestige items in the budget and give preference to generic technology programs that serve our competitiveness and economic goals and that provides a base for our industries to compete against their foreign competitors.

Congress also needs to address the optimum use of existing resources, like the over 700 Government laboratories. A selected few of these should be redirected to support generic technologies that industry requires. This will only be effective if industry participates in the planning, execution, and funding of such an effort. The laboratories will only take this effort seriously if Congress is serious about making it happen.

I would ask that Congress make permanent the R&D tax credit. This will encourage industry to fund the effort more fully than would otherwise be the case.

When I last appeared before this committee I heard some encouraging words from Senator Danforth that I think bear repeating. He said that the policies of the Federal Government can help science and they can hurt science. He called on his colleagues to commit themselves to making things better by meeting with scientific leaders on a systematic, sustained basis to be what he called a constant voice for science. By singling out science, I know he also meant to include technology.

He also urged that, despite committee jurisdiction, a more coherent approach be used by Congress in order to optimize and prioritize the competing demands on R&D. I do not have to tell you that I would welcome that constant voice. Without such constant support, our leadership efforts in these areas will be hit and miss at best. This is an approach none of us would welcome. I think this is not only a common sense approach, but one that is long overdue.

Thank you very much, and I am glad to answer your questions.

The CHAIRMAN. Thank you both. We will be in recess in a moment as there is a roll call vote taking place on the floor.

[Recess.]

The CHAIRMAN. Very good. This is an outstanding report. But what we have here—and what I am trying to highlight in my first question, Mr. Fisher, is that you used the word "leadership." The difference is that many foreign governments are systematically providing leadership in these technologies. Then when we hear from Mr. Bloch, he gets even a little bit bolder.

He gets a little bit bolder. I think he uses the word "money." [Laughter.]

On the second page of the report you state that we have lost the market leadership to foreign competitors who have had the active support and funding of their governments. We are now beginning to pierce that veil of nonsense Government intervention is bad for business and that we should let the market forces operate. You see, that is the sing-song we have had to listen to for 10 years, and the country has gone broke. Technology has flowed overseas, and we are about to lose the trade war, the war for economic security. The big problem as I see it, Mr. Fisher, is that we have to cut out this fancy dancing around the fire with respect to Government being an element in the economic equation of comparative advantage.

David Ricardo and Economics 101 and the doctrine of comparative advantage, i.e., you produce what you can produce best, without any tariffs or barriers, and we will trade with you what we produce best without any tariffs. Free trade, free trade.

Well, the Founding Fathers suggested that 200 years ago. Alexander Hamilton, in a booklet called Reports on Manufacturers, told the British to bug off. He said, we are not going to remain in your colony. The first bill that passed the national Congress on July the 4th, 1789, was a tariff bill on 30 articles, beginning with steel and going right on down the list.

We built this economic giant, this industrial giant, the USA, with protectionism, and today it persists in certain areas. Our competitors at GATT complain about our energy policies—we have cheap energy because we subsidize it with various exploration and other tax benefits, that there are price supports for agriculture, and protective quotas on some goods. Moreover we have the Export-Import Bank.

Where is that "New York Times" article? The administration came out here 3 days ago and said we should assist the U.S. arms industry. After I have been

listening to the administration for 10 years resist any assistance to industry, I saw here on Monday, "White House seeks to revive credits for arms exports, a move to help industry"—a financial move to help industry. Now here we have some misgivings. We are supposed to be disarming and not promoting the sale of more weapons to Third World countries. Certainly, if we are going to finance anything we ought to be financing these critical technologies that you have identified, not bombs and missiles and tanks.

But you see, they finally give in on what they want for the military-industrial complex, but nothing for the civilians' economic strength. And this is what I really wanted to get to with you gentlemen, because you give us credibility. They think we are just parochial Senators looking out for the textile industry, or looking out for the oil industry, or whatever industry you have in your particular State. But if you travel the 50 of them like I have, you see it is endemic to the entire 50.

But I think we have tried over the years and we have developed means to improve industry access to university and Federal labs. And I want to ask you what should we add on, because you seem to say we really do not need anything else. Specifically we have improved access to the universities and Federal laboratories under certain Stevenson-Wydler Technology Innovation Act and the Federal Technology Transfer Act in 1986.

We have dual-use technology such as the smart weapons and everything else like that from DARPA. And then, of course, we addressed the civilian side here in 1988 by transforming the National Bureau of Standards into the National Institute of Standards and Technology with regional research centers and with the advance technology program.

Is it your idea we build on these things to keep the Government moving in that direction, working with industry in the partnership?

Mr. FISHER. Well, Mr. Chairman, you have said a lot there, and I could say, yes, and be done.

The CHAIRMAN. Thank you very much. The next witness, please.

Mr. FISHER. I am privileged, by the way, to be a scientist and engineer, and did not get my mind too distorted by a lot of those fancy economic theories that were mentioned. And what I can tell you is I live every day, and have for many years, the real competitive battles in the world of trade. I think that what we try to point out in this report is that, increasingly, it is essential for this country to recognize that commercial competitiveness—the competitiveness of our industries in the global enterprise is essential not just for the economic well-being of this country, but just as much so for our national security.

Increasingly, the technologies that are being developed and used in our national security establishment are technologies which first and foremost are showing up in commercial applications. The day is over when we think we can focus simply on national defense technologies to the exclusion of commercial technologies. Therefore, I think a recognition on all of our part that technology that is the core to commercial industrial success is, in fact, a national priority—or must be so—is essential, and we need alignment from the executive branch through Congress, through industry, through labor, and through academia.

I think getting that alignment will go a long way in addressing what we know are the problems once we accept that as the issue.

The CHAIRMAN. Well, specify if you please. You say that the report lays down a specific policy framework. Elaborate on that. What is the framework as you envision it? Suppose you were the President or you were the Senator, and you wanted to introduce a bill or not introduce a bill or issue an executive order. What

would you do? We know that Government, industry, and academia can work together. That is the success of the space program.

When we had the challenge of Sputnik, and we wanted to get to the moon, we had academia, industry, and Government joining hands, our National Science Foundation that Mr. Bloch headed up, everything. We joined hands and were the first on the moon.

What is the specific policy framework you suggest in this report?

Mr. FISHER. I think first in our recommendations there are cited five. But first and foremost we, as I just said, have to get the President and the executive branch as well as Congress to say that commercial technology development in these critical technologies is really a priority for this Nation—first and foremost.

Secondly we need, working with private sector as well as the Federal Government, to establish an infrastructure that is accommodating and encouraging to private industry to make the necessary investments in these critical technologies.

The CHAIRMAN. That is maybe what I should be asking. The infrastructure, that is a broad term. Can you delineate it for us now. I am trying to find out what change to the present system, or what additions, or whatever—what is the infrastructure as you view it?

Mr. FISHER. I think there are many dimensions to that. Without going into all the details, there are certainly first and foremost the obvious, the financial dimensions. We mentioned earlier R&D tax credit, permanent extension, taking a look at depreciation rules for highly capital-intensive industries. Those I would categorize in the obvious.

But I think you can go further that that into the infrastructure of communication and transportation and education in this country, that needs to be significantly bolstered in order to enable companies to develop these technologies. For instance high-speed—this is not particularly mentioned in the report—but high-speed communications links, the high-speed computing initiative, the work that needs to be done our highway infrastructures of this country to transport people.

All of those types of infrastructure need to be pulled up by the Government, in addition to the one that we do not spend much time on in the report, of education—not that we do not believe that education is not important. Quite to the contrary, we feel that it is fundamentally important and essential that we address as part of the infrastructure. But in this report we concentrated on technologies, not on education as such.

The CHAIRMAN. You say the report declares that U.S. policy does not adequately support American leadership in critical technologies, and it recognizes that American industry and universities must share the blame for the erosion of America's technological leadership—and the Government, now principally the Government. It is not academia, it is not industry, because if the Government sets that environment, they will develop their technology here.

In my 24 years up here I have seen a good bit of this technology in a briefcase headed overseas. I can give example after example after example of the technology that was developed here but has gone overseas. Housing: 20 years ago we had it out at Vandenburg and GE-1, the design for a three-bedroom, bath-and-a-half, living room, dining room, kitchen home—I think they could build it for $21,000 at the time. And we wanted the Bureau of Standards to set some standardized zoning so we could put up these houses.

We could not commercialize that technology, so they went with the Japanese, and they put them all around Saudi Arabia and Jordan and all these other countries. They went in with the Japanese, because they could not get it to the market here. I have seen that time and time again, coming to Government, and Government giving them the sing-song of "free market, free market." Let the

market forces operate and we are going out of business. That is the big thing that you have got to change here, I believe.

Mr. FISHER. Well, I think that you are on to a key. I think that the free markets can in fact operate if everybody is operating with the same set of rules. In fact that is not the case. It is, I believe, unrealistic to expect it to be the case, and I think it is time for some realism on all our parts.

The CHAIRMAN. We have tried since World War II the high-wire approach of do as we do and setting a good example for free trade. It has been found desperately wanting. It would be good if we could sort of set the example, as we are both indicating, let the market forces operate. But as long as others don't follow our example we lose.For example, total financing like in Japan, they will correlate the financing, and then they will allocate a license.

We sold Fords and Chevrolets in downtown Tokyo long before World War II, but they gave a license on it to Nissan and Toyota. And they produced a lousy car for the first 5 years.

But the Japanese government said, only these two companies could produce cars in Japan. And only those two could be sold in downtown Tokyo. So where we got antitrust, they got pro-trust.

Then they control price, and then they go after world market share, and we like ninnies continue this "free market, free market." The technology is bound to leave here. I can produce cheaper overseas than I can here and my stockholders want that, so as long as I do not mind these long flights and nice meals in downtown Paris, Tokyo, or wherever I will go overseas. Bangkok is a good place. Jakarta, Indonesia, is another good place.

Mr. FISHER. By the way, if I could be so presumptuous, I would like to correct that last statement, because I believe that today many of our industries are learning to manufacture as inexpensively in this country as anywhere in the world. We in fact in our company, and this is not a Motorola discussion, but we make cellular telephones in Arlington Heights, Illinois, not particularly your low-cost center of the world, and ship them all over the United States. We also do it with the highest quality and lowest cost of anybody in the world, including the world's best.

The CHAIRMAN. I am proud of that correction, and I have had my staff go see that, because Motorola stays 3 years ahead of everybody else. You keep developing, so you are on the leading edge. We can do that in certain industries of that kind. Let me yield to my colleague here. Senator Gore.

OPENING STATEMENT BY SENATOR GORE

Senator GORE. Mr. Chairman, thank you so much. I want to welcome Erich Bloch back to the committee. I know you have already done so. We became good friends during his tenure in the Government, and certainly I am not surprised to see him associated with this terrific report, and Mr. Fisher, you have a hard act to follow with John Young, also, who was head of this group for a long time. I am an admirer of your company and of your work. I have got one of those little telephones that you have been so successful with.

I do not think anybody, any company in the world matches that particular technology. Do they?

Mr. FISHER. Well, when we came out with that 2 years old, so that is an old product now. We said that eventually somebody would catch up, and we expect in probably June somebody will introduce one that sort of catches up. We have not been standing still.

Senator GORE. Well, anyway, I am serious when I say it is a real demonstration of what American companies can do in competing with any other corporations in the world, based in any other country in the world, and my congratulations.

Let me get my history straight. President Reagan initially established a group that was kind of the father of this group. Is that right?

Mr. FISHER. Yes, sir.

Senator GORE. And the group got together and came out with recommendations, and they got the vague sense that maybe the President was not really listening to what you had to say, and so it was reconstituted in the private sector. You made several reports, but this one is the strongest yet, and really represents a clear forceful statement by America's business community, about what needs to be done to secure U.S. leadership in these areas. Is that a fair summation?

Mr. FISHER. Absolutely.

Senator GORE. All right. I also get the feeling—and now maybe this has something to do with Erich Bloch's joining over there—that unlike earlier reports, this one is not just a report. It is a project to change the country. It is a report accompanied by a work plan to aggressively get this message across to the people who need to hear it, and then take those steps necessary to change policy. You are not just telling us what you think ought to be done. Your are going to follow up. After you talk with us, you are going to talk to others, and you are going to be taking aggressive steps to try to get these ideas adopted. Is that fair?

Mr. FISHER. Yes. As we pointed out before—and Erich Bloch's tutelage has been very helpful in this respect—there are many, many lists of critical technologies sitting around this town, all of which are collecting dust, or most of them. It is our belief that, given that there is great commonality in all of these, including our own, that what is missing is a drive to implement change, and to raise the priority in the entire Government. We intend to use the energies of the Council on Competitiveness to that end.

Senator GORE. Well, I think that is great, and I am encouraged as well that you single out the high-performance computing initiative. You did in a response a moment ago, and you highlighted it in the report the nationwide network of information superhighways. It, of course, has been an effort by this committee for quite some time to get that accomplished, and this year, the President has finally requested some money for it. Chairman Hollings presided over the session just yesterday, when we voted that bill out unanimously, and this strong endorsement in you report is very welcome as we take that to the floor.

Now, I will not belabor the points that you make here. I think they are very clearly expressed. I have been in several hearings that Senator Hollings has chaired, where we have gone over the critical technologies, and so I am not surprised by your first key finding that there is a broad domestic and international consensus about the critical generic technologies that are driving economic growth and competitiveness.

We have sat in this very hearing room and gone through them one by one, and you are right, it is the same list. It is not a mystery. We can stop making, and we can start working the list. What is the old saying, plan your work, and then work your plan. Well we have been planning our work, but we have not been working our plan.

It will sound a little partisan to say this, but we have not had the leadership in the White House to direct that effort. It is just that simple.

This committee has outlined what needs to be done and has taken its own initiative, with NIST and the other things that the chairman has worked on since before I was on this committee. But as a practical matter, in order to really get the job done, you have to have that leadership at the top. We have not had that.

But the other place it has to come, in addition to in the Congress, is in the private sector. And in conclusion I will simply say—and I will have some questions for the record, incidentally, if you would not mind responding in that fashion — I would simply close by saying how encouraged I am that you are providing the leadership and focus in the private sector, and in the business community especially.

I have to believe that even though there is kind of an ideological resistance and almost a willful blindness to the nature of this problem in the executive branch today, in the White House. I will say there are some good people in the Commerce Department and elsewhere who know what needs to be done, but cannot speak up.

But there is a willful unwillingness to do this in the White House, so I hope that by stating it so clearly and so forcefully, that this report will contribute to a change, and that your efforts accompanying the report will also contribute to that change. I assure you that we will continue to be very, very active on this, because I know the chairman and his determination on this very well, and I join with him in stating on my own to do what I can to help further this agenda.

I want to congratulate you on the report. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much. Senator Gore, as you know, is the chairman of our Science Subcommittee, and giving wonderful leadership to it.

There is no dispute as to the basic premise that, as technology goes, so goes the economy. There is no dispute about the identified disciplines, whether it is aerospace or computers, pharmaceuticals, right on down the list.

There is not dispute about the need for education. We all claim we are going to put more money here, more for math and science. President Bush said he wanted to become the "Education President." Everybody is running around to try to find, or give choice, do anything to say, I though of this and put some money to it.

The dispute really comes about with respect to who provides the funds, support, and leadership. What we are really talking about is money. We put very little in the Advanced Technology Program. We made some awards there just the other day. There was tremendous competition, 249 applied in the first round and we expect 400-500 will apply in the second round. That is just a little $10 million program, to take these small, ingenious discoveries and technologies and try to boost them along commercially.

And as large, successful Motorola, you cannot wait for that. You have identified your competition, and like a golf game, you are competing with yourself, and you have got to keep moving. So the money is there.

Mr. FISHER. I hope, sir, it is better than my golf game.

The CHAIRMAN. That is right, but you are competing against yourself, in a way. There is nobody close to you right now, and that is what you want to make certain that none gets close. But, what can the Government do to help? Can we establish more Institute of Technology and Standards regional centers, or enlarge the Advanced Technology Program? Are we headed in the right direction in the ATP? Would you support more of these types of programs?

Mr. FISHER. I tell you what, I would appreciate if Erich Bloch would address that, given that he has spent enough years here.

The CHAIRMAN. I would be pleased also, Mr. Bloch.

Mr. BLOCH. Well, I would say, first of all, that all the programs that you mentioned deserve a lot of support, because they are doing a real job. But rather than going into individual programs and identify $5 million here and $2 million there—and I think we had that discussion once before—I think it is much more

important for both the administration and for Congress to understand and put as a priority item the support of generic technologies today.

That could mean materials, that could mean Semitech in one case, it can mean one of those regional centers in the other case. But I think we have to become much clearer than we are today, that that has to have the priority, and I think that is what George Fisher meant before, when he said we are spending a lot of money, and we are not after additional money. But we are not spending the money right. We are spending too much on defense R&D, by the way not generic defense, but R&D for very specific ones.

We are not spending enough on the technologies that have been identified in that report, and I think that making that change, that basic kind of a change, what should have the priority, is what Congress needs to address in its deliberations on the budget.

The CHAIRMAN. Well, that is what I had in mind in leading into that question. You and I both know that you can and do have generic technologies in defense, but we're talking about competition and we have been struggling. We in the congressional arm have been trying to get the NSF into more generic technologies, and are being more or less stonewalled at every turn.

No, no, they say, market forces, we cannot get in, businesses have got to do that, and everything else. And then all of a sudden the headlines say, oh, wait a minute, the defense industry. You see, already we are going to that technology, and we will subsidize the technology its development, and its commercialization. We are trying to emphasize the civilian side and generic technologies and in a way we are already facing competition right within the Government. What is your comment about that?

Mr. BLOCH. Well, I must say a similar thing I said before, that we had better build up that infrastructure that was talked about before, which is technologies and facilities, and equipment and people, that allow them later on in industry to convert that into marketable kind of products.

But I think it is the Government's co-responsibility, not the only responsibility, to make sure that we have that kind of a base, and conserve that base and enhance that particular base. I know that Congress many times focuses on a particular project or a program, but I think in general we have to lift up our base to the point where it can stay competitive, and we are not losing to foreign competition.

Mr. FISHER. Lest we lose perspective of our approach in this report, I do not want it to be read as an indication that all of the problems are the U.S. Government's problems, because that is clearly not the fact, and that is not the intent of the report. There is a very large body, in fact the preponderance of the burden for our competitiveness issues do rest with private industry and academia. I just wanted to make sure that in this conversation, which is appropriately directed to concerns of your interest, and our country's interest, that we do not come across as saying the problem is altogether, guys. U.S. industry has a great requirement on its own part to pull itself up.

The CHAIRMAN. We use all the buzzwords, and cajole and fuss at industry. You have to be more competitive, be more competitive, everywhere I go we politicians will tell you the same thing. Let me, for the sake of the hearing here, blame Government. Blame us, blame me and tell about industry's frustration, and then you two scientists correct me and tell me specifically how to get it straightened out.

You are before the Commerce Committee. Somebody would think we were in charge of foreign trade. It used to be named the Committee on Foreign Commerce. Then it was the Committee on Foreign and Interstate Commerce. We

get to confirm the Secretary of Commerce, but once we confirm him we can't get him to cooperate on our initiatives. The most I can get from him is a little old, itty-bitty tourist program, of $17 million.

The Foreign International Trade Administration, the Export Office, all these offices are gone from Commerce. The

Special Trade Representative, the reciprocal trade agreements, finance, the Export-Import bank are controlled under the Finance Committee and Banking, Housing and Urban Affairs. Agricultural farm commodities are before the Agricultural Committee. Much goes in before foreign policy. We are talking about defense, and that goes before the Defense Committee.

I know that when President Truman came to town, and he had a similar problem, and he had Casey come upstairs and tell him, look, here is what the intelligence reports show. The Secretary of State said that is not the policy, and the Defense Department said that is not in our security interest. And he said, I cannot make heads or tails out of you fellows, but I am going to put you underneath me, here, and you beat up on each other and give me two or three alternatives, and I will make a decision.

And out of that he instituted the National Security Council, and he got the Atlantic Alliance, the North Atlantic Treaty Organization, the Marshall Plan, the Truman Doctrine—all the vision. Now here is a fellow could not run a haberdashery, but he knew how to run Government.

I have got the same feeling relative to this about technology trade and our economic security. There are 28 departments and agencies involved in these areas. How are you going to really get it all together, or get the attention or that little word, "leadership." How are we going to get the leadership. If you were the President, I know what Mr. Bloch thinks, because he acted like the President when he was head of the National Science foundation.

Now, Mr. Fisher, what do you think? If you were the President. Tell me, Mr. Fisher, first what would you do? I think the key is Government involvement. If I can get that then the academics, and then industry will come to town and join in quickly. They will go anywhere where the action is. You talk about the Yankee trader. There are over 10,000 applications to into Kuwait right now—everything from a Western Sizzler steakhouse to an oil refinery.

We act here within the Beltway like there is not the interest, and everybody is out there panning for gold. That industry and academia are thinking short term, and they got to think in long term. We do not enact tax measures to make anybody think long term. You do not have that volition. How would you organize the Government if you were the President. If you developed here an energy that is identifiable and responsive, American industry will come, but now they say, why waste time with lawyers and all the red tape in Washington. We are not getting anywhere, and so I am going where the action is. And it's not in Washington DC.

Mr. FISHER. Well I think it is easy to play President. I am not encumbered by the responsibilities, but if I were in that position, with respect to this subject I would clearly use the power and prestige of the presidency, which after the war is greater than ever. I would use that to clearly state a national priority being commercial leadership based on critical technology excellence.

I think a few words from the President, plus charging his people to map out a road map of how get from here to there, to true leadership in each of the generally agreed-upon technologies, which are as important to the defense industry as they are to the commercial enterprises. I think that is about what is needed to get the momentum turned around and started in the right direction. We need a clear statement of priorities, that this is important.

The CHAIRMAN. But Mr. Fisher, if you get the priority statements you have got to have some money to back them up. I mean, we have had a presidential statement of priorities in transportation and crime. Now we in Congress can pass them both, and I think we will do something in 100 days, but that is not going to do anything, we need a commitment of money.

Mr. FISHER. In many respects, as we do point out in the report, we are fully cognizant of $318 billion budget deficit, or ever what the latest tally is, and obviously we are concerned about that. That directly and indirectly affects our ability to compete, and to get money. In that context, we think it is prudent and possible to in fact re-juggle the way we spend some money, and do a better job focusing on these critical technologies as priorities, relative to some of the other things we may be doing.

So in fact, although I would agree, if we were in prosperous times, living with a budget surplus, I would be up here leading the charge to ask for more money for these things. I think reality dictates that is not likely to happen, and I think reality also says that we can make some priority decisions and re-juggle how we spend some of the present money.

The CHAIRMAN. Mr. Bloch, how would you organize the Government into a more responsive environment for the industry and academia sectors of our society?

Mr. BLOCH. Well, I think a few things have been done of late to move in that direction, you know the reestablishment of OSTP as a more forceful kind of member of the White House, is certainly one. The establishment by Dr. Bromley of the FCCSET committees as a coordinating group in many areas, I think had a beneficial kind of an effect. We need to go further and beyond that. We have got to make sure that these FCCSET committees get their input from industry and from academia and not just try to sort out things among themselves.

I think, if you look at the 1992 budget, there are some good things in there. And our 81 was mentioned, high- performance computing and communication initiatives. The materials initiative is another one. So in this sense that you talked about before are in that particular budget, probably not to the extent that they should be, and that is certainly true. But that has to do with priorities. I think it is very important that the priorities be changed also. The whole R&D budget will not be passed by Congress. I have no doubt about that.

But I think that what could be passed is a more focussed kind of an effort on these generic technologies we are talking about, and about on the institutions that are important in promulgating these, like DARPA, like NSF, like NIST, like the centers that we talked about before. All of that taken together, together with what George Fisher mentioned before, a statement of priorities by the President, I think would be a very forceful kind of a function that would move us in the direction that we should be moving in. And then continuity of that, same thing next year, and the year after, and so forth—not that after a year we give up on that and start something else again.

The CHAIRMAN. Senator Gorton.

Senator GORTON. Well, thank you, Mr. Chairman. I am in on this late, and I am going through the statements, because I feel this is such an important issue, but I do not have any questions at this time.

The CHAIRMAN. Very good. The whole idea is Senator Bentsen wanted to ask some questions, and I appreciate Senator Gorton being with us, Senator Gore.

This is fundamental. I do not know of a finer group that could be gotten together over a 2-year period to give its conscientious consideration of this particular opportunity, as I look on it, for the country, and I do not know of any better guidelines. That is why we wanted to have particular as you submit your

report today, to have this cursory hearing, in the original instance, and then we will keep the record open for the other Senators and other questions to give it emphasis.

Is there some arrangement for the executive branch to receive this?

Mr. BLOCH. Yes, definitely. We are distributing this report to the executive branch, just like we are distributing it to Congress. And by the way, we had some discussions with the executive branch as we went through the preparation of the report, so I do not thing there is much in here that is a big surprise. That is important, and we will continue to do that, obviously.

Mr. FISHER. Thank you.

The CHAIRMAN. Very good. Well, we thank both of you gentlemen today. We will keep the record open, and it is most impressive, and we cannot thank you enough.

The committee will be in recess.

[Whereupon, at 3:19 p.m., the hearing was adjourned.]

[The following information was subsequently received for the record:]

COUNCIL ON COMPETITIVENESS,
April 5, 1991

THE HONORABLE ERNEST F. HOLLINGS,
Chairman Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, D.C

Dear Senator Hollings: Thank you for the opportunity to testify before the Senate Commerce Committee on March 20, 1991 about the Council's new technology report, Gaining New Ground: Technology Priorities for America's Future. The Council put a great deal of time and energy into this report, and during the coming year we will be making a ma;or effort to implement its policy recommendations. look forward to continuing to work closely with you in this effort.

I am well aware of the important work that you have been doing in the area of technology and competitiveness. We all appreciate the leadership you have shown in creating NIST and establishing the ATP. We hope that the recommendations contained in the Council's report will also make a contribution to U.S. technology policy. In particular, I would like to draw your attention to the Council's recommendation for the National Institute of Standards and Technology, which states the following:

Provide adequate funding for the National Institute of Standards and Technology (NIST) Advanced Technology Program and its Manufacturing Technology Transfer Centers to give them a chance to succeed. and establish benchmarks to make sure that industry involved. Although the R&D budgets of most federal agencies have grown substantially over the past decade, NIST's budget has been essentially flat. The NIST budget should be increased so that it is adequate to contribute to U.S. leadership in generic technologies. NIST's Advanced Technology Program already has received start-up funds ($9 million in FY 1990 and $36 million in FY 1991). The original legislation for this program envisioned a budget between $100 and $250 million within four years of its creation. This level appears adequate, but the program should be carefully reviewed to make sure that it has a direct payoff for American industry. The current NIST plan is to increase the number of Manufacturing Technology Transfer Centers from 3 to 12 by 1995. These NIST programs focus primarily on small and mid-sized companies where increases in productivity and performance can have a major impact on U.S. competitiveness. NIST should coordinate its work in key technologies closely with the Defense Advanced Research Projects Agency (DARPA), which has extensive management experience in this area, and with the national labs.

Please let me know if there is anything the Council can do to help turn this recommendation into reality. I look forward to continuing to cooperate with your office in the effort to improve Americans technological competitiveness.

Sincerely,

GEORGE M.C. FISHER, *Chairman.*